

User Manual

TesiMod Hand-held Terminal HTP32

| | |
|--------------|------------|
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| Version | Date | Modifications |
|---------|------------|----------------|
| 1 | 2005-09-28 | First Edition |
| 2 | 2011-01-14 | Technical data |

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1 Important Notes

1.1 Symbols

The symbols in this manual are used to draw your attention on notes and dangers.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



DANGER

This symbol is used to refer to instructions which, if ignored or not carefully followed, will result in death or serious injury.



WARNING

This symbol is used to refer to instructions which, if ignored or not carefully followed, could result in death or serious injury.



CAUTION

This symbol is used to refer to instructions which, if ignored or not carefully followed, could result in minor or moderate injury.



NOTICE

This symbol and the accompanying text alerts the reader to a situation which may cause damage or malfunction to the device, either hardware or software, or surrounding property.



Reference to source of information

This symbol refers to detailed sources of information on the current topic.

1.2 Safety Notes

- Read this manual carefully before using the operating device. Keep this manual in a place where it is always accessible to all users.
- Proper transportation, handling and storage, placement and installation of this product are prerequisites for its subsequent flawless and safe operation.
- This user manual contains the most important information for the safe operation of the device.
- The user manual, in particular the safety notes, must be observed by all personnel working with the device.
- Observe the accident prevention rules and regulations that apply to the operating site.
- Installation and operation must only be carried out by qualified and trained personnel.

1.3 Intended Use

- The device is designed for use in the industry.
- The device is state-of-the art and has been built to the latest standard safety requirements. However, dangerous situations or damage to the machine itself or other property can arise from the use of this device.
- The device fulfills the requirements of the EMC directives and harmonized European standards. Any modifications to the system can influence the EMC behavior.



NOTICE: Radio Interference

This is a class A device. This device may cause radio interference in residential areas. In this case, the user may be required to introduce appropriate countermeasures, and to bear the cost of same.

1.4 Target Group

All configuration, programming, installation, commissioning, operating and maintenance work in connection with the automation system must be performed by trained personnel only (e.g. qualified electricians, electrical engineers, etc.).

The configuration and programming personnel must be familiar with the safety concepts of automation technology.

The operating personnel must have been trained in handling the controller and be familiar with the operating instructions.

The installation, commissioning and maintenance personnel must have an education which entitles them to work on automation systems.

2 Design and Commissioning

2.1 Unpacking the Device

Unpack all parts carefully and check the contents for any visible damage in transit. Also check whether the shipment matches the specifications on your delivery note.

If you notice damages in transit or discrepancies, please contact our sales department immediately.

2.2 Design

2.2.1 Front View with Dimensions

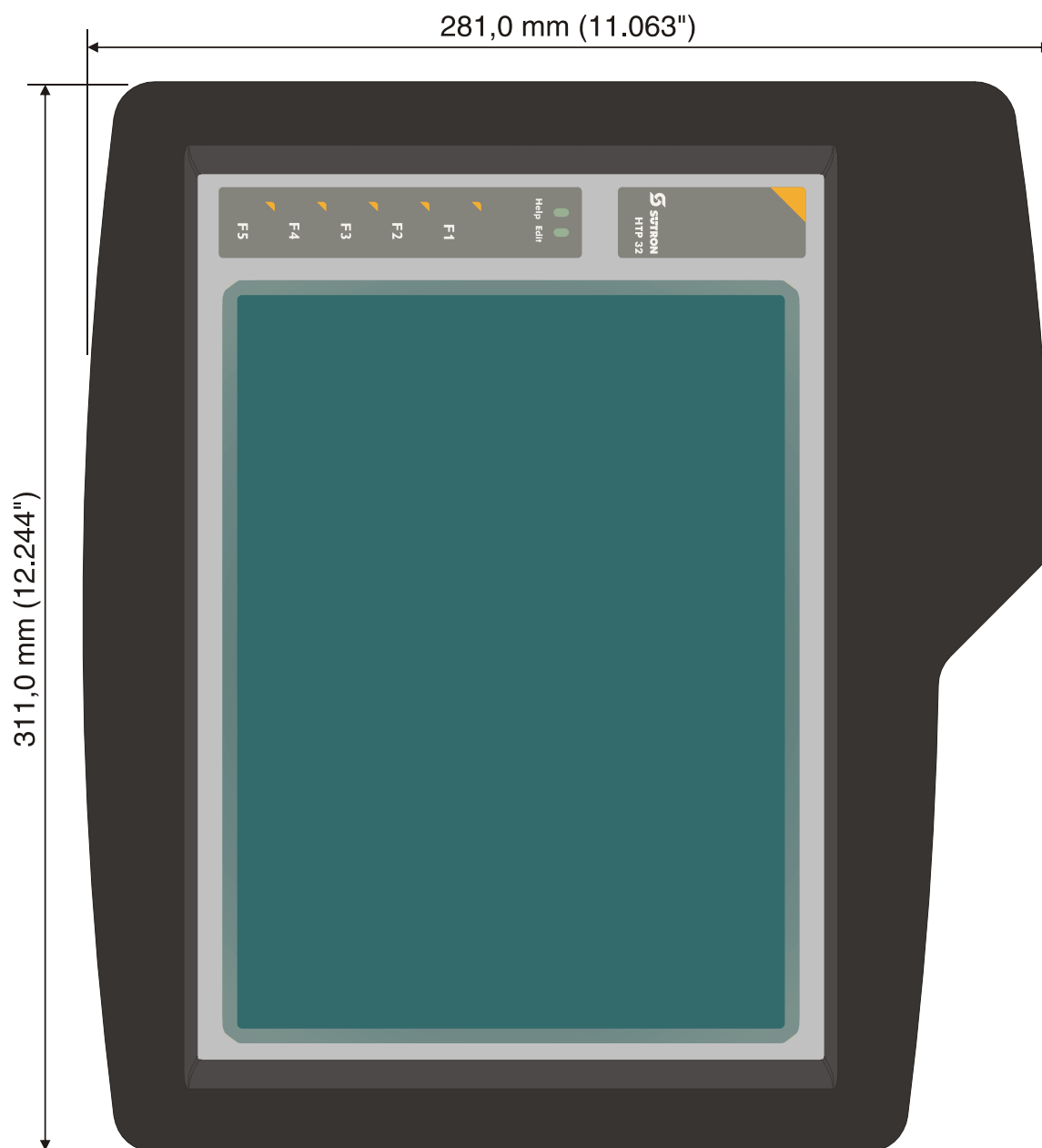


Figure 2-1 Front view with dimensions

2.2.2 Side View with Dimensions



Figure 2-2 Side View with Dimensions

2.2.3 Rear View



Figure 2-3 Rear view

- 1 Housing Screws
- 2 Consent Switch (Jokab switch)
- 3 Handle Set (Option)
- 4 Nameplate
- 5 Flap for CompactFlash Card
- 6 Flap for Download Interface
- 7 Consent Switch (Euchner switch)

2.3 Connecting the Device



Hazardous voltages can exist inside electrical installations that can pose a danger to humans. There is a risk of electric shock when touching live parts!



For information on the pin or core numbers for the supply voltage, please refer to the chapter "Device Interfaces".

The device is protected against polarity reversal. The device will not operate if the polarity is incorrect.

This device is in Protection Class I. To ensure safe operation, a safety extra-low voltage (SELV) according to DIN EN 61131 must be used for the supply voltage.

The 16 pin connector consists of the following components:

Table 2-1 16 pin cable connector

| Designation | Part Number |
|-----------------|----------------|
| Cable Connector | TU-16P1N8A8UAB |
| Crimp Pins | RC-12P2000 |

To connect a device with a 16 pin connector, you need a suitable connector which consists of the following components:

Table 2-2 16 pin device connector

| Designation | Part Number |
|---|----------------|
| Device Connector (Front Panel Mounting, Soldering Contacts) | TU-16S1N12WB00 |

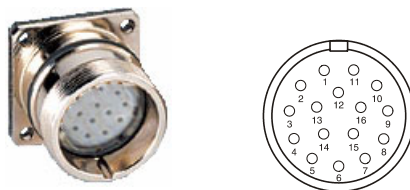


Figure 2-4 16 pin device connector / pin diagram



The listed parts can be obtained from CONINVERS GmbH. A crimp tool must be used to crimp the crimp pins. This tool can also be obtained from CONINVERS GmbH.

The 19 pin connector consists of the following components:

Table 2-3 19 pin cable connector

| Designation | Part Number |
|-----------------|----------------|
| Cable Connector | TU-1RP1NRA8UAB |

Table 2-3 19 pin cable connector

| Designation | Part Number |
|-------------|-------------|
| Crimp Pins | RC-6LP2000 |
| | RC-6NP2000 |
| | RC-6EP2000 |

To connect a device with a 19 pin connector, you need a suitable connector which consists of the following components:

Table 2-4 19 pin device/coupler connector

| Designation | Part Number |
|--|----------------------------------|
| Device Connector (Front Panel Mounting) or Coupler Connector | TU-1RS1NRAWB00 TU-1RS1NRA9UAB |
| 16 x Crimp Female Connector (Pin 1 - 5, 13 - 18, 19) | RC-6LS2000 |
| 3 x Crimp Female Connector (Pin 6, 12, 19) | RC-6FS2000 |

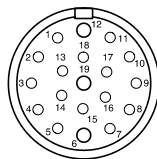


Figure 2-5 Pin diagram for 19 pin connector



The listed parts can be obtained from CONINVERS GmbH. A crimp tool must be used to crimp the crimp pins. This tool can also be obtained from CONINVERS GmbH.

2.4 Switching the Device on

After you applied the supply voltage, a system test is carried out during which the modules in the operating device are tested and initialized. All status LEDs are activated for a short time. A number of system and error messages can be output by the system test. If the application memory contains a valid project, the first mask, i.e. the „Start mask“ or the mask defined in the TSwin language parameters as the Start-up mask appears on the display. A beep also sounds by the integrated loudspeaker.

The „Start mask“ is displayed for 5 seconds. This is a fixed time setting. After this time has elapsed, the „Main mask“ or the mask defined in the language parameters as the Main mask appears on the display. This is the first mask of the operator guidance.

When you touch the display while the „Start mask“ is displayed, the „Setup mask“ appears. In this mask you define the parameters for the interfaces and the operating device.

2.5 Identification

You can identify the operating device by the nameplate on the rear.

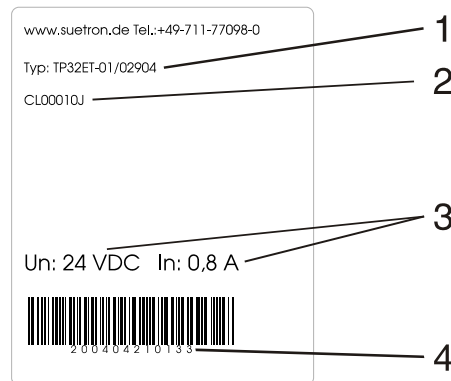


Figure 2-6 Nameplate (example)

- 1 Order Number
- 2 Firmware Version (Version on Delivery)
- 3 Voltage and Current
- 4 Serial Number

Depending on the size of the display, you will be able to read various types of information as the operating device is initialized: clock frequency, application memory size, current firmware version, TSwin version, project name, time, date, number of compilation runs and a random number.



Because the initialization mask is visible only for a few seconds there is a possibility to represent this mask for a longer time period.

1. Hold down an arbitrary key at the operating device to generate an error message.
2. Read the firmware version now.
3. Release the key to complete the initialization procedure of the operating device.

3 Control and Display Elements

3.1 Keyboard

The keys are positioned under an environmental-proof polyester foil. You project the operating principle of the keys in the programming software.

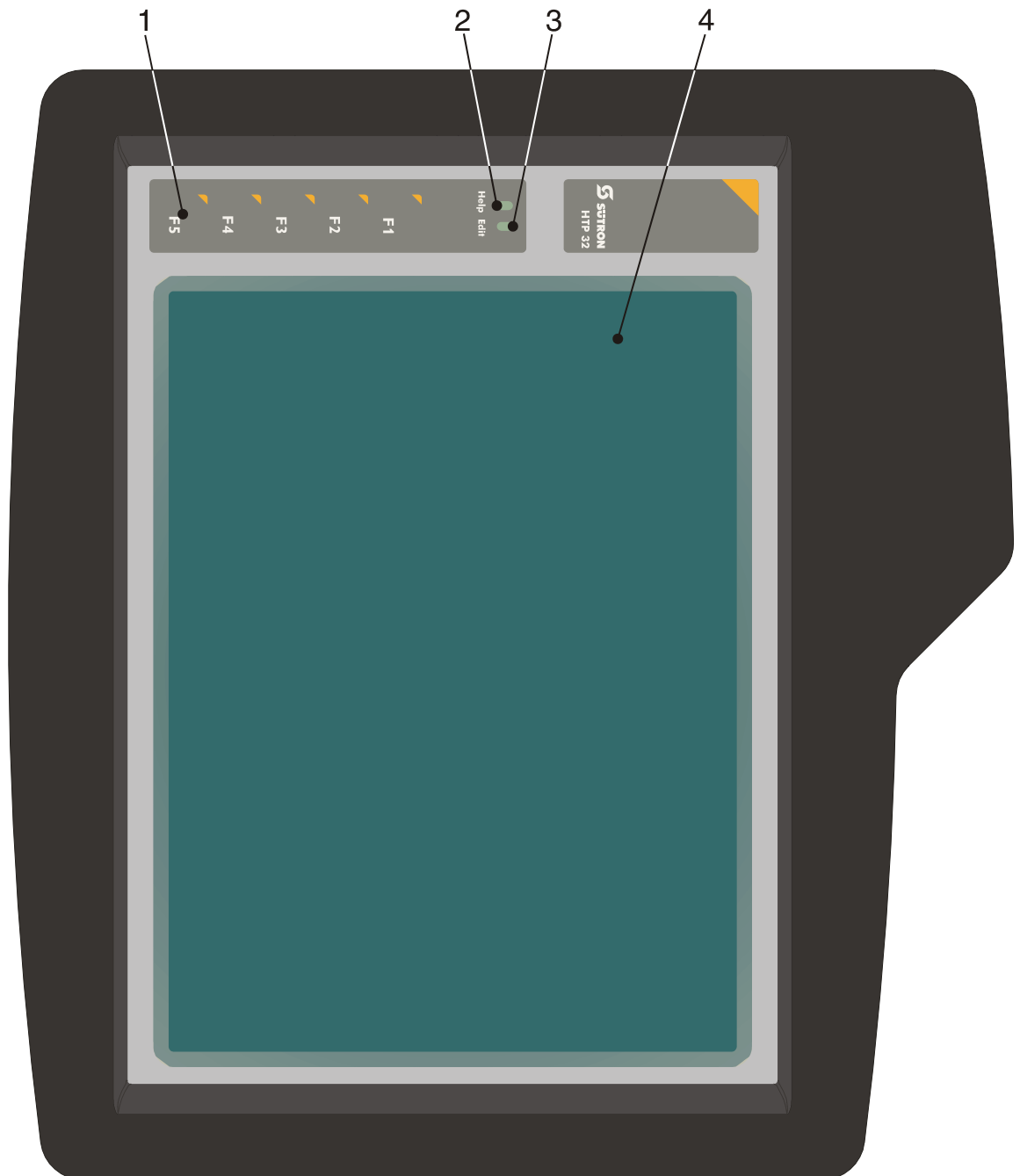


Figure 3-1 Front view

- 1 Function Keys F1 to F5
- 2 Status LED "Help"
- 3 Status LED "Edit"
- 4 Display

3.1.1 Function Keys



The function of the function keys is freely assignable (with soft key functions). The function keys can be used either as direct keys for menu control or for triggering a function in the controller.

3.1.2 Status LEDs

The following status LEDs are at the operating device:

| | |
|------|--------------------------------------|
| Help | Indicates an upcoming system message |
| Edit | Indicates the editing mode |

3.2 Touch Screen

The device is equipped with a resistive 4 wire touch screen. You operate the device using this touch screen.



NOTICE: Damage

Pointed or sharp objects, such as pens or fingernails, can lead to irreparable damages of the touch screen. Exclusively therefore use the fingertips or the aids indicated in the technical data for the operation.



NOTICE: Damage

To protect the touch screen you can use special protection foils. You receive corresponding protection foils directly from Sutron electronic.

3.3 Consent Switch

The device can be fitted with an 3-step consent switch. Operating sequences can only be performed if the 3-step switch is set to its middle position. The stop signal is issued when the switch is set to its upper and lower position. After a stop in the lowest position, the release command can only be issued if the switch is fully released and pushed to the middle position again.

Each machine can run in two operating modes, normal mode and special mode. In normal mode (automatic), the machine performs its normal operational tasks. In this mode, safety is provided by closed, isolating protective equipment and/or using active non-isolating protective equipment that blocks access.

The special operating modes of a machine are designed to maintain the normal mode. In this case, safety must be ensured in a different manner than is provided during normal mode because hazardous areas of the machine must be accessed and specific movements must be possible.

In this case, it must be possible to operate the machine at a reduced speed in accordance with the risk assessment, whereby movement is only possible if the consent equipment is actuated simultaneously. The operator must possess the necessary qualifications and training and be familiar with the details of the intended use in accordance with the instruction manual.

The safety-related parts of the controller used to reduce the speed and for the consent equipment must be constructed so that they comply with the EN 954-1 safety category determined on the basis of the risk analysis.

The use of a 2-circuit design for the consent equipment enables compliance with safety category 3 according to EN 954-1:1996. The draft C-standard covering machine tools and processing machinery stipulates the following:

Consent equipment may consist of either a 2-position command unit combined with a stop module or of a 3-position command unit. The use of a 3-position command unit is preferable.

EN 60204 describes the mode of operation of the consent equipment. Based on information gathered from accident research and on the technical solutions currently available, the 3-step consent switch represents state-of-the-art technology. Positions 1 and 3 of the consent switch are "OFF" functions. Only the middle position activates consent. EN 60204-1:1997 is identical to IEC 60204-1, as a result of which the 3-step consent switch is internationally recognized.

The stop category of the consent equipment must be selected on the basis of a risk assessment and must correspond to a Category 0 or Category 1 stop.



Warning!

The consent switch is only suitable for use as a protection function if the person operating the consent switch is able to recognize hazards to personnel in good time and can then immediately initiate hazard prevention measures!

Slower movement speed may also be necessary as an additional measure. The permissible speed must be determined on the basis of a risk assessment.



Warning!

No commands related to hazardous conditions may be initiated by the consent switch alone. A second, conscious start command is necessary (button on hand-held operating device). Only the person operating the consent switch is permitted to be present in the hazardous area.

The following standards must be applied for the risk analysis to be carried out:

- EN 292, General principles for machine design
- EN 1050, Risk assessment of machines

- EN 954-1, Safety-related parts of control systems

These considerations are combined to form a safety category (B, 1, 2, 3, 4) in accordance with EN 954-1, which stipulates the characteristics of the safety-related parts for the system to be monitored.

3.4 Stop Push-button / Emergency Stop Push-button

The device can be fitted with an optional STOP push-button or an emergency stop push-button.

The STOP push-button on the operating device ensures that the system to be monitored is shut down safely in accordance with EN 60204-1:1997, Paragraph 9.2.5.3. The stop function can be a Category 0, 1 or 2 stop according to EN 60204-1:1997, Paragraph 9.2.2 and must be defined according to the risk assessment.

Therefore, the stop function of the operating device can be used for a safe machine stop as well as for looping into the emergency stop circuit of the system to be monitored.

The signals of the STOP push-button use different circuits in the two versions of the linkbox. In the case of the linkbox with an emergency stop function, the signals control the stop circuit or emergency stop circuit of the system to be monitored. If no hand-held operating device is connected, the stop circuit or emergency stop circuit, respectively, is closed. In the linkbox without an emergency stop function, on the other hand, the signals of the stop circuit or emergency stop circuit are sent via the STOP push-button. If no hand-held operating device is connected, the stop circuit or emergency stop circuit, respectively, of the system to be monitored is open.

The term "stop looping" has the following meaning: The stop circuit or emergency stop circuit, respectively, of the system to be monitored is looped through the linkbox and not interrupted, irrespective of whether the hand-held operating device is connected to the linkbox (and the STOP push-button has not been operated) or not. This functionality is only available with the linkbox with an emergency stop function.



WARNING

If using a hand-held operating device with an emergency stop button, you must ensure that the connecting cable is securely installed.

A hand-held operating device that is not connected to the machine must be stored out of sight of the user!

Bear in mind that the nearest emergency stop will be activated in the event of danger. If it does not work because it is not connected, this could have fatal consequences!



WARNING

If the hand-held operating device is equipped with a STOP push-button but it is not connected to the linkbox, a stop can not be triggered using the hand-held operating device – the STOP push-button of the hand-held operating device is ineffective!

Install stationary emergency stop buttons that are available at all times on the system to be monitored.



WARNING

If the stop circuit has been implemented as a Category 0 or 1 stop, the stop function must be effective regardless of the operating mode. A Category 0 stop must have priority. The releasing of the STOP push-button must NOT lead to hazardous conditions (also see EN 60204-1:1997 Chapter 9.2.5.3).

The stop function is not a substitute for safety devices.

3.5 User Mode Switch


NOTICE: Damage

When opening and closing the operating device, you must take care not to damage the seal and make sure that it always sits in the slot provided.


NOTICE: Damage

Electrostatic discharge can damage electronic components. Observe the ESD protective measures!

The user mode switch is positioned at the bottom right in the top shell of the operating device. To operate the user mode switch, proceed as follows:

1. Disconnect the operating device from the supply voltage.
2. Remove the screws on the rear of the housing and lift off the housing.
3. Set the desired operating mode (see table).
4. After setting the operating mode, place the housing rear panel back onto the device.
5. Carefully screw the screws tightly into the rear panel of the housing again.
6. Connect the operating device with the supply voltage.



Figure 3-2 Position of user mode switch



The switch positions for ON or OFF are printed onto the termination switch.

Table 3-1 User Mode Switch

| S1 | S2 | S3 | S4 | Operating Mode |
|----|----|----|----|--|
| I | X | – | – | Standard mode with PLC (default upon delivery) |
| I | X | I | – | Standard mode without PLC |
| I | – | – | I | Activate download (deletes application memory) and default contrast / default brightness setting |
| I | – | I | I | Activate upload |
| – | – | – | – | Calibration mask is called-up on startup |
| – | – | I | – | Calibration mask is called-up on startup and the calibration process is started immediately |

Legend for table:

I = Switch ON

– = Switch OFF

X = Any switch position

3.6 Display



DANGER: Toxic

If the display is damaged, avoid touching, swallowing or breathing in the liquids or gases which may leak out!



DANGER: Corrosive

If the display is damaged, avoid touching, swallowing or breathing in the liquids or gases which may leak out!

The operating device is equipped with a TFT display.

3.6.1 Brightness Setting

To define the brightness setting, set up the system variable **LcdBackLight** in any mask within the programming software.



To do so, follow the instructions listed in the programming software's help topic „How do I specify the contrast / brightness setting for the operating device“.

In the programming software, enter the following values as lower and upper limits for the representation type.

Table 3-2 Values for representation type

| System Variable | Lower Limit | Upper Limit | Default Setting |
|-----------------|-------------|-------------|-----------------|
| LcdBackLight | 0 | + 15 | + 8 |



If you do not configure the system variable **LcdBackLight**, the default setting is used when the device is initialized.

If you did set up the system variable, you can set the brightness as follows. Enter the mask where you set up the system variable and:

1. Press the brightness button.
2. Enter a new value for the brightness. To do so, use the keyboard shown on the screen.
3. Confirm with Enter.

The new brightness setting becomes effective immediately after the Enter key is pressed. If necessary, repeat the steps two and three until you are satisfied with the brightness.

3.6.2 Default Brightness Setting

If the brightness setting is such that it is no longer possible to read the masks, you can use the user mode switch to reset the brightness to the default value.



For the table with the switch positions of the user mode switch, see chapter „User Mode Switch“.



The switch position for the default brightness is identical with the „Activate download via hardware“. The brightness is reset before a corresponding message is displayed. The warning will be displayed in a legible manner.

To restore the default brightness:

1. Switch the device off.
2. Set the switches S1 and S4 of the user mode switch to ON.
3. Switch the device on again.
4. When the warning appears, switch the device off again.
5. Set switch S4 to OFF.
6. Then switch the device on again.

The application will not be lost.

3.6.3 Character Attributes

The following character attributes can be displayed on the device:

- Normal
- Underlined
- Foreground / background color

3.6.4 Fonts

You are able to use the Windows character sets. Further you can use the font "Normal" and the font "Zoom" or create and use your own character sets.

4 Interfaces of the Device

Depending on the device variant, several interfaces are available:

Table 4-1 Device variants

| Order Number | Available Interfaces | | | | | | | | Connector | | | Command Devices | | | | | Mounting Variant |
|---------------------------|---------------------------|-----------------------|-------------|-----|-----------|----------|-----|-------------|----------------|------------------|------------------|-----------------------|------------------|------------|----------------|---------|------------------|
| | RS232 (Download / Upload) | RS232 (Communication) | RS485/RS232 | CAN | DeviceNet | INTERBUS | MPI | PROFIBUS-DP | Open Cable End | 16 Pin Connector | 19 Pin Connector | Emergency Stop Switch | Stop Push-Button | Key Switch | Consent Switch | Encoder | |
| HTP32Ex/02903/013/06xxx01 | X | - | - | - | - | - | - | - | - | X | - | - | - | X | X | - | 1 |
| HTP32Ex/18903/022/00xxx02 | X | - | - | - | - | X | - | - | X | - | - | X | - | - | X | X | 2 |
| HTP32Ex/02903/032/00xxx03 | X | X | - | - | - | - | - | - | X | - | - | - | - | X | X | X | 3 |
| HTP32Ex/02903/042/00xxx04 | X | X | - | - | - | - | - | - | X | - | - | X | - | X | X | - | 4 |
| HTP32Ex/19903/041/00xxx05 | X | - | - | - | X | - | - | - | X | - | - | X | - | X | - | - | 5 |
| HTP32Ex/16903/051/00xxx06 | X | - | - | - | - | - | X | - | X | - | - | X | - | - | - | - | 6 |
| HTP32Ex/16903/051/08xxx06 | X | - | - | - | - | - | X | - | - | - | X | X | - | - | - | - | 6 |
| HTP32Ex/52903/062/00xxx07 | X | - | - | - | - | - | - | X | X | - | - | X | - | - | X | - | 7 |
| HTP32Ex/52903/062/09xxx07 | X | - | - | - | - | - | - | X | - | - | X | X | - | - | X | - | 7 |
| HTP32Ex/01903/061/00xxx08 | X | - | X | - | - | - | - | - | X | - | - | X | - | - | - | - | 8 |
| HTP32Ex/01903/061/03xxx08 | X | - | X | - | - | - | - | - | - | X | - | X | - | - | - | - | 8 |
| HTP32Ex/52903/072/00xxx09 | X | - | - | - | - | - | - | X | X | - | - | - | X | - | X | - | 9 |
| HTP32Ex/52903/072/09xxx09 | X | - | - | - | - | - | - | X | - | - | X | - | X | - | X | - | 9 |
| HTP32Ex/52903/072/00xxx10 | X | - | - | - | - | - | - | X | X | - | - | - | X | - | X | - | 10 |
| HTP32Ex/52903/072/10xxx10 | X | - | - | - | - | - | - | X | - | - | X | - | X | - | X | - | 10 |
| HTP32Ex/01903/071/00xxx11 | X | - | X | - | - | - | - | - | X | - | - | - | X | - | - | - | 11 |
| HTP32Ex/02903/072/00xxx12 | X | X | - | - | - | - | - | - | X | - | - | - | X | - | X | - | 12 |
| HTP32Ex/02903/072/09xxx12 | X | X | - | - | - | - | - | - | - | - | X | - | X | - | X | - | 12 |
| HTP32Ex/09903/061/00xxx13 | X | - | - | X | - | - | - | - | X | - | - | X | - | - | - | - | 13 |
| HTP32Ex/02903/003/00xxx14 | X | X | - | - | - | - | - | - | X | - | - | - | - | - | X | - | 14 |
| HTP32Ex/02903/003/11xxx14 | X | X | - | - | - | - | - | - | - | X | - | - | - | - | X | - | 14 |

The standard operating device is supplied with an open cable end. Optionally, the operating device can be equipped with an assembled 16 or 19 pin connector.

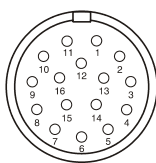


Figure 4-1 Pin diagram for 16 pin connector

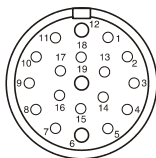


Figure 4-2 Pin diagram for 19 pin connector

The connecting cable is constructed of five components (16 pin cable) or six components (20 pin cable), respectively.

Table 4-2 Connecting Cable

| 16 Pin Cable | 20 Pin Cable | Usage |
|--------------------------|--------------------------|--|
| 3 x 0.5 mm ² | 3 x 0.5 mm ² | Voltage Supply |
| 2 x 0.25 mm ² | 2 x 0.25 mm ² | Communication (Shielded) |
| 3 x 0.25 mm ² | 3 x 0.25 mm ² | Communication (Shielded) |
| 5 x 0.25 mm ² | 5 x 0.25 mm ² | Emergency Stop Button / Consent Switch / Command Devices |
| 2 x 1.0 mm ² | 2 x 0.5 mm ² | |
| 1 x 0.25 mm ² | 5 x 0.25 mm ² | |

4.1 RS232 (Download / Upload)

The interface is only designed to be used for downloads, uploads, a scanner or a logging printer because the interface is not electrically isolated.

To carry out a download or an upload, proceed as follows:

1. Carefully unscrew and remove the protective cap (see figure) of the download/upload interface.
2. Plug the cable onto the interface of the operating device.
3. Connect the other end of the cable with the serial interface of the PC.
4. Now carry out the download or upload.
5. After the download/upload is complete, remove the cable from the interfaces again.
6. Carefully tighten the protective cap for the download/upload interface again.

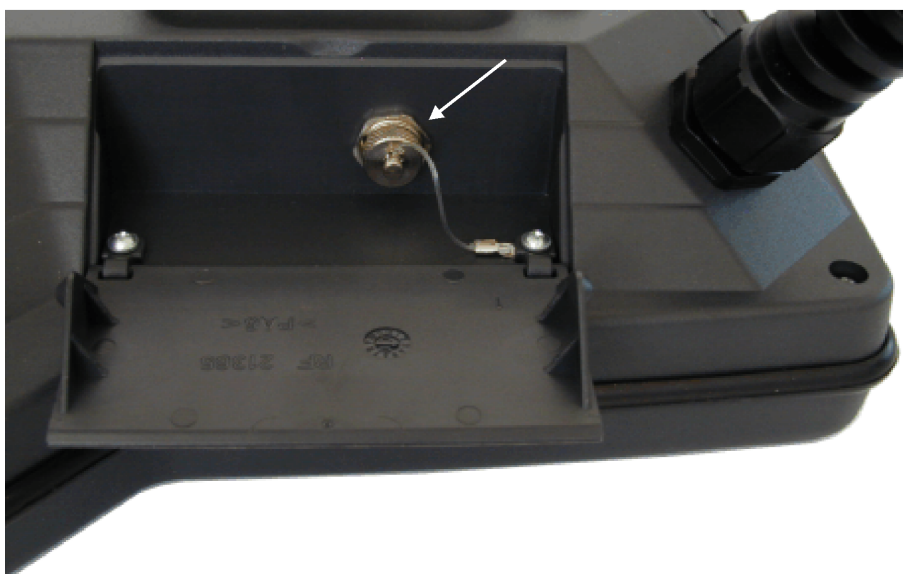


Figure 4-3 Position of download/upload interface

4.1.1 Pin Assignment

Connector in the operating device: 5 pin female connector - Binder series 702.

Table 4-3 Pin assignment of the RS232 interface

| Pin | Designation | Function |
|-----|-------------|------------------|
| 1 | TD | Transmitted Data |
| 2 | RD | Received Data |
| 3 | CTS | Clear to Send |
| 4 | RTS | Request to Send |
| 5 | GND | Ground |




You can obtain an assembled cable directly from Sutron electronic.

4.2 Mounting Variant 1

4.2.1 Pin/Cable Assignment

Pin/cable assignment for open cable end or 16 pin device connector.

Table 4-4 Pin/cable assignment

| Pin | Wire | ø mm ² | Design. | Function |
|-----|-------------------------|-------------------|---|---|
| 8 | BK | 3 x 0.5 | 0 V | Supply Voltage 0 VDC |
| 9 | VT | | + 24 V | Supply Voltage 24 VDC |
| 10 | YE | |  | Low-Noise Ground |
| 15 | RD | 2 x 0.25 | - | Input Acknowledgment Key Light (Red) |
| 16 | GN | | RD | Received Data |
| 7 | GR | 3 x 0.25 | SGND | Signal Ground |
| 13 | WH | | TD | Transmitted Data |
| 14 | BN | | - | Input Signaling Light (24 V) |
| 11 | PK | 5 x 0.25 | - | Output Illuminated Push-Button Channel 2 |
| 5 | WHYE | | - | Input Switch Channel 1 |
| 6 | BNGN | | - | Output Key Switch Channel 1 |
| 2 | WHGN | | ZST 1.2 | Output Consent Switch Channel 1 |
| 1 | RDBU | | ZST 2.2 | Output Consent Switch Channel 2 |
| 3 | BU | 1.0 | - | Input Switch Channel 2 |
| 4 | BN | 1.0 | - | Output Key Switch Channel 2 |
| 12 | OR (Jumper to Pin 9) | 0.25 | - | Detection of Operating Device in the System |




For operating devices with open cable ends, make sure to connect the shield with the protective ground.

4.3 Mounting Variant 2

4.3.1 Pin/Cable Assignment

Pin/cable assignment for open cable end or 26 pin device connector.

Table 4-5 Pin/cable assignment

| Pin | Wire | ø mm ² | Design. | Function |
|-----|------|-------------------|---|--------------------------|
| 8 | BK | 3 x 0.5 | 0 V | Supply Voltage 0 VDC |
| 9 | VT | | + 24 V | Supply Voltage 24 VDC |
| 10 | YE | |  | Low-Noise Ground |
| 16 | RD | 2 x 0.25 | DO1- | INTERBUS out |
| 15 | GN | | DO+ | INTERBUS out |
| 14 | BN | 3 x 0.25 | DI- | INTERBUS in |
| 13 | WH | | DI1+ | INTERBUS in |
| 7 | GR | | GND | Ground |
| 3 | BU | 2 x 0.5 | - | Emergency Stop Channel 2 |
| 4 | BN | | Ö | Emergency Stop Channel 2 |
| 5 | WHYE | 5 x 0.25 | - | Emergency Stop Channel 1 |
| 6 | BNGN | | Ö | Emergency Stop Channel 1 |
| 1 | RDBU | | S | Consent Switch Channel 1 |
| 2 | WHGN | | S | Consent Switch Channel 2 |
| 11 | PK | | S | Consent Switch Channel 1 |
| 12 | OR | 5 x 0.25 | S | Consent Switch Channel 2 |
| 17 | WHPK | | - | A-Signal (Encoder) |
| 18 | GRBN | | - | 0 V (Encoder) |
| 19 | WHGR | | - | B-Signal (Encoder) |
| 20 | YEBN | | - | 24 V (Encoder) |



For operating devices with open cable ends, make sure to connect the shield with the protective ground.

4.4 Mounting Variant 3

4.4.1 Pin/Cable Assignment

Pin/cable assignment for open cable end or 26 pin device connector.

Table 4-6 Pin/cable assignment

| Pin | Wire | ø mm² | Design. | Function |
|-----|------|----------|---------|--------------------------|
| 8 | BK | 3 x 0.5 | 0 V | Supply Voltage 0 VDC |
| 9 | VT | | + 24 V | Supply Voltage 24 VDC |
| 10 | YE | | (⊥) | Low-Noise Ground |
| 16 | RD | 2 x 0.25 | RD | Received Data |
| 15 | GN | | CTS | Clear to Send |
| 14 | BN | 3 x 0.25 | RTS | Request to Send |
| 13 | WH | | TD | Transmitted Data |
| 7 | GR | | SGND | Signal Ground |
| 3 | BU | 2 x 0.5 | - | Key Switch Channel 2 |
| 4 | BN | | Ö | Key Switch Channel 2 |
| 5 | WHYE | 5 x 0.25 | - | Key Switch Channel 1 |
| 6 | BNGN | | Ö | Key Switch Channel 1 |
| 1 | RDBU | | S | Consent Switch Channel 1 |
| 2 | WHGN | | S | Consent Switch Channel 2 |
| 11 | PK | 5 x 0.25 | S | Consent Switch Channel 1 |
| 12 | OR | | S | Consent Switch Channel 2 |
| 17 | WHPK | | - | A-Signal (Encoder) |
| 18 | GRBN | | - | 0 V (Encoder) |
| 19 | WHGR | | - | B-Signal (Encoder) |
| 20 | YEBN | | - | 24 V (Encoder) |




For operating devices with open cable ends, make sure to connect the shield with the protective ground.

4.5 Mounting Variant 4

4.5.1 Pin/Cable Assignment

Pin/cable assignment for open cable end or 26 pin device connector.

Table 4-7 Pin/cable assignment

| Pin | Wire | ø mm ² | Design. | Function |
|-----|------|-------------------|---|--------------------------|
| 8 | BK | 3 x 0.5 | 0 V | Supply Voltage 0 VDC |
| 9 | VT | | + 24 V | Supply Voltage 24 VDC |
| 10 | YE | |  | Low-Noise Ground |
| 16 | RD | 2 x 0.25 | RD | Received Data |
| 15 | GN | | CTS | Clear to Send |
| 14 | BN | 3 x 0.25 | RTS | Request to Send |
| 13 | WH | | TD | Transmitted Data |
| 7 | GR | | SGND | Signal Ground |
| 3 | BU | 2 x 0.5 | - | Emergency Stop Channel 2 |
| 4 | BN | | Ö | Emergency Stop Channel 2 |
| 5 | WHYE | 5 x 0.25 | - | Emergency Stop Channel 1 |
| 6 | BNGN | | Ö | Emergency Stop Channel 1 |
| 1 | RDBU | | S | Consent Switch Channel 1 |
| 2 | WHGN | | S | Consent Switch Channel 2 |
| 11 | PK | | S | Consent Switch Channel 1 |
| 12 | OR | 5 x 0.25 | S | Consent Switch Channel 2 |
| 17 | WHPK | | - | Key Switch Channel 1 |
| 18 | GRBN | | - | Key Switch Channel 2 |
| 19 | WHGR | | - | Key Switch Channel 1 |
| 20 | YEBN | | - | Key Switch Channel 2 |



For operating devices with open cable ends, make sure to connect the shield with the protective ground.

4.6 Mounting Variant 5

4.6.1 Pin/Cable Assignment

Pin/cable assignment for open cable end or 26 pin device connector.

Table 4-8 Pin/cable assignment

| Pin | Wire | ø mm ² | Design. | Function |
|-----|------|-------------------|---------|--------------------------------|
| 8 | BK | 3 x 0.5 | 0 V | Supply Voltage 0 VDC |
| 9 | VT | | + 24 V | Supply Voltage 24 VDC |
| 10 | YE | | (⊕) | Low-Noise Ground |
| 16 | RD | 2 x 0.25 | CAN_H | CAN_H Bus Line (Dominant HIGH) |
| 15 | GN | | CAN_L | CAN_L Bus Line (Dominant LOW) |
| 14 | BN | 3 x 0.25 | - | Not Connected |
| 13 | WH | | - | Not Connected |
| 7 | GR | | - | Not Connected |
| 3 | BU | 2 x 0.5 | - | Emergency Stop Channel 2 |
| 4 | BN | | Ö | Emergency Stop Channel 2 |
| 5 | WHYE | 5 x 0.25 | - | Emergency Stop Channel 1 |
| 6 | BNGN | | Ö | Emergency Stop Channel 1 |
| 1 | RDBU | | - | Not Connected |
| 2 | WHGN | | - | Not Connected |
| 11 | PK | | - | Not Connected |
| 12 | OR | 5 x 0.25 | - | Not Connected |
| 17 | WHPK | | - | Key Switch Channel 1 |
| 18 | GRBN | | - | Key Switch Channel 2 |
| 19 | WHGR | | - | Key Switch Channel 1 |
| 20 | YEBN | | - | Key Switch Channel 2 |




For operating devices with open cable ends, make sure to connect the shield with the protective ground.

4.7 Mounting Variant 6

4.7.1 Pin/Cable Assignment

Pin/cable assignment for open cable end or 19 pin device connector.

Table 4-9 Pin/cable assignment

| Pin | Wire | ø mm ² | Design. | Function |
|-----|------|-------------------|---|--|
| 1 | BK | 3 x 0.5 | 0 V | Supply Voltage 0 VDC |
| 2 | VT | | + 24 V | Supply Voltage 24 VDC |
| 12 | YE | |  | Low-Noise Ground |
| 13 | GN | 2 x 0.25 | RxD/TxD-N | Received Data / Transmitted Data Minus |
| 14 | RD | | RxD/TxD-P | Received Data / Transmitted Data Plus |
| 3 | GR | 3 x 0.25 | - | A (Encoder 1) |
| 4 | WH | | - | /B (Encoder 1) |
| 5 | BN | | - | A (Encoder 2) |
| 6 | BU | 2 x 0.5 | - | Emergency Stop Channel 2 |
| 19 | BN | | Ö | Emergency Stop Channel 2 |
| 7 | RDBU | 5 x 0.25 | - | 0 V (Encoder 1 + 2) |
| 8 | WHGN | | - | + 5 VDC (Encoder 1 + 2) |
| 9 | WHYE | | - | Emergency Stop Channel 1 |
| 16 | BNGN | | Ö | Emergency Stop Channel 1 |
| 17 | PK | | - | /A (Encoder 1) |
| 10 | OR | 5 x 0.25 | - | B (Encoder 1) |
| 11 | WHPK | | - | /A (Encoder 2) |
| 15 | GRBN | | - | B (Encoder 2) |
| 18 | WHGR | | - | /B (Encoder 2) |
| - | YEBN | | - | Not Connected |




For operating devices with open cable ends, make sure to connect the shield with the protective ground.

4.8 Mounting Variant 7

4.8.1 Pin/Cable Assignment

Pin/cable assignment for open cable end or 19 pin device connector.

Table 4-10 Pin/cable assignment

| Pin | Wire | ø mm ² | Design. | Function |
|-----|------------------|-------------------|---|--|
| 1 | BK | 3 x 0.5 | 0 V | Supply Voltage 0 VDC |
| 2 | VT | | + 24 V | Supply Voltage 24 VDC |
| 12 | YE | |  | Low-Noise Ground |
| 13 | GN | 2 x 0.25 | RxD/TxD-N | Received Data / Transmitted Data Minus |
| 14 | RD | | RxD/TxD-P | Received Data / Transmitted Data Plus |
| 18 | GR | 3 x 0.25 | DGND | Data Transmission Potential |
| 11 | WH | | CNTR-P | Repeater Control Signal Plus |
| - | BN | | - | Not Connected |
| 7 | BU | 2 x 0.5 | Ö | Emergency Stop Channel 2 |
| 8 | BN | | Ö | Emergency Stop Channel 2 |
| 6 | RDBU | 5 x 0.25 | - | Consent Switch Channel 2 |
| 19 | WHGN | | - | Consent Switch Channel 1 |
| 9 | WHYE | | Ö | Emergency Stop Channel 1 |
| 16 | BNGN | | Ö | Emergency Stop Channel 1 |
| 17 | PK | | - | Consent Switch Channel 2 |
| 10 | OR | | - | Consent Switch Channel 1 |
| - | WHPK | 5 x 0.25 | - | Not Connected |
| - | GRBN | | - | Not Connected |
| - | WHGR | | - | Not Connected |
| - | YEBN | | - | Not Connected |
| 3 | Jumper to Pin 4 | | - | - |
| 5 | Jumper to Pin 15 | | - | - |



For operating devices with open cable ends, make sure to connect the shield with the protective ground.

4.9 Mounting Variant 8

4.9.1 Pin/Cable Assignment

Pin/cable assignment for open cable end or 16 pin device connector.

Table 4-11 Pin/cable assignment

| Pin | Wire | ø mm ² | Design. | Function |
|-----|------|-------------------|----------|--------------------------|
| 8 | BK | 3 x 0.5 | 0 V | Supply Voltage 0 VDC |
| 9 | VT | | + 24 V | Supply Voltage 24 VDC |
| 10 | YE | | \oplus | Low-Noise Ground |
| 15 | GN | 2 x 0.25 | T(A) | Transmitted Data (+) |
| 16 | RD | | T(B) | Transmitted Data (-) |
| 7 | GR | 3 x 0.25 | SGND | Signal Ground |
| 13 | WH | | R(A) | Received Data (+) |
| 14 | BN | | R(B) | Received Data (-) |
| 3 | BU | 2 x 0.5 | Ö | Emergency Stop Channel 2 |
| 4 | BN | | Ö | Emergency Stop Channel 2 |
| 1 | RDBU | 5 x 0.25 | - | Not Connected |
| 2 | WHGN | | - | Not Connected |
| 5 | WHYE | | Ö | Emergency Stop Channel 1 |
| 6 | BNGN | | Ö | Emergency Stop Channel 1 |
| 11 | PK | | - | Not Connected |
| 12 | OR | 5 x 0.25 | - | Not Connected |




For operating devices with open cable ends, make sure to connect the shield with the protective ground.

4.10 Mounting Variant 9

4.10.1 Pin/Cable Assignment

Pin/cable assignment for open cable end or 19 pin device connector.

Table 4-12 Pin/cable assignment

| Pin | Wire | ø mm ² | Design. | Function |
|-----|------------------|-------------------|---|--|
| 1 | BK | 3 x 0.5 | 0 V | Supply Voltage 0 VDC |
| 2 | VT | | + 24 V | Supply Voltage 24 VDC |
| 12 | YE | |  | Low-Noise Ground |
| 13 | GN | 2 x 0.25 | RxD/TxD-N | Received Data / Transmitted Data Minus |
| 14 | RD | | RxD/TxD-P | Received Data / Transmitted Data Plus |
| 18 | GR | 3 x 0.25 | DGND | Data Transmission Potential |
| 11 | WH | | CNTR-P | Repeater Control Signal Plus |
| - | BN | | - | Not Connected |
| 7 | BU | 2 x 0.5 | Ö | Stop Push-Button Channel 2 |
| 8 | BN | | Ö | Stop Push-Button Channel 2 |
| 6 | RDBU | 5 x 0.25 | - | Consent Switch Channel 2 |
| 19 | WHGN | | - | Consent Switch Channel 1 |
| 9 | WHYE | | Ö | Stop Push-Button Channel 1 |
| 16 | BNGN | | Ö | Stop Push-Button Channel 1 |
| 17 | PK | | - | Consent Switch Channel 2 |
| 10 | OR | | - | Consent Switch Channel 1 |
| - | WHPK | 5 x 0.25 | - | Not Connected |
| - | GRBN | | - | Not Connected |
| - | WHGR | | - | Not Connected |
| - | YEBN | | - | Not Connected |
| 3 | Jumper to Pin 4 | | - | - |
| 5 | Jumper to Pin 15 | | - | - |




For operating devices with open cable ends, make sure to connect the shield with the protective ground.

4.11 Mounting Variant 10

4.11.1 Pin/Cable Assignment

Pin/cable assignment for 19 pin device socket.

Table 4-13 Pin/cable assignment

| Pin | Wire | ø mm ² | Design. | Function |
|-----|------------------|-------------------|---|--|
| 1 | BK | 3 x 0.5 | 0 V | Supply Voltage 0 VDC |
| 2 | VT | | + 24 V | Supply Voltage 24 VDC |
| 12 | YE | |  | Low-Noise Ground |
| 13 | GN | 2 x 0.25 | RxD/TxD-N | Received Data / Transmitted Data Minus |
| 14 | RD | | RxD/TxD-P | Received Data / Transmitted Data Plus |
| 18 | GR | 3 x 0.25 | DGND | Data Transmission Potential |
| 11 | WH | | CNTR-P | Repeater Control Signal Plus |
| - | BN | | - | Not Connected |
| 7 | BU | 2 x 0.5 | Ö | Stop Push-Button Channel 2 |
| 8 | BN | | Ö | Stop Push-Button Channel 2 |
| 6 | RDBU | 5 x 0.25 | - | Consent Switch Channel 2 |
| 19 | WHGN | | - | Consent Switch Channel 1 |
| 9 | WHYE | | Ö | Stop Push-Button Channel 1 |
| 16 | BNGN | | Ö | Stop Push-Button Channel 1 |
| 17 | PK | | - | Consent Switch Channel 2 |
| 10 | OR | 5 x 0.25 | - | Consent Switch Channel 1 |
| - | WHPK | | - | Not Connected |
| - | GRBN | | - | Not Connected |
| - | WHGR | | - | Not Connected |
| - | YEBN | | - | Not Connected |
| 3 | Jumper to Pin 4 | | - | - |
| 5 | Jumper to Pin 15 | | - | - |




For operating devices with open cable ends, make sure to connect the shield with the protective ground.

4.12 Mounting Variant 11

4.12.1 Cable Assignment

Cable assignment for open cable end.

Table 4-14 Cable assignment

| Wire | ø mm ² | Design. | Function |
|------|-------------------|---|--------------------------|
| BK | 3 x 0.5 | 0 V | Supply Voltage 0 VDC |
| VT | | + 24 V | Supply Voltage 24 VDC |
| YE | |  | Low-Noise Ground |
| GN | 2 x 0.25 | T(A) | Transmitted Data (+) |
| RD | | T(B) | Transmitted Data (-) |
| GR | 3 x 0.25 | SGND | Signal Ground |
| WH | | R(A) | Received Data (+) |
| BN | | R(B) | Received Data (-) |
| BU | 2 x 0.5 | Ö | Emergency Stop Channel 2 |
| BN | | Ö | Emergency Stop Channel 2 |
| RDBU | 5 x 0.25 | - | Not Connected |
| WHGN | | - | Not Connected |
| WHYE | | Ö | Emergency Stop Channel 1 |
| BNGN | | Ö | Emergency Stop Channel 1 |
| PK | | - | Not Connected |
| OR | 5 x 0.25 | - | Not Connected |
| WHPK | | - | Not Connected |
| GRBN | | - | Not Connected |
| WHGR | | - | Not Connected |
| YEEN | | - | Not Connected |



For operating devices with open cable ends, make sure to connect the shield with the protective ground.

4.13 Mounting Variant 12

4.13.1 Pin/Cable Assignment

Pin/cable assignment for 19 pin device socket.

Table 4-15 Pin/cable assignment

| Pin | Wire | ø mm ² | Design. | Function |
|-----|------------------|-------------------|---------|----------------------------|
| 1 | BK | 3 x 0.5 | 0 V | Supply Voltage 0 VDC |
| 2 | VT | | + 24 V | Supply Voltage 24 VDC |
| 12 | YE | | (⊥) | Low-Noise Ground |
| 13 | GN | 2 x 0.25 | RD | Received Data |
| - | RD | | - | Not Connected |
| - | GR | 3 x 0.25 | - | Not Connected |
| 11 | WH | | TD | Transmitted Data |
| 18 | BN | | SGND | Signal Ground |
| 7 | BU | 2 x 0.5 | Ö | Stop Push-Button Channel 2 |
| 8 | BN | | Ö | Stop Push-Button Channel 2 |
| 6 | RDBU | 5 x 0.25 | - | Consent Switch Channel 2 |
| 19 | WHGN | | - | Consent Switch Channel 1 |
| 9 | WHYE | | Ö | Stop Push-Button Channel 1 |
| 16 | BNGN | | Ö | Stop Push-Button Channel 1 |
| 17 | PK | | - | Consent Switch Channel 2 |
| 10 | OR | 5 x 0.25 | - | Consent Switch Channel 1 |
| - | WHPK | | - | Not Connected |
| - | GRBN | | - | Not Connected |
| - | WHGR | | - | Not Connected |
| - | YEBN | | - | Not Connected |
| 3 | Jumper to Pin 4 | | - | - |
| 5 | Jumper to Pin 15 | | - | - |




For operating devices with open cable ends, make sure to connect the shield with the protective ground.

4.14 Mounting Variant 13

4.14.1 Cable Assignment

Cable assignment for open cable end.

Table 4-16 Cable assignment

| Wire | ø mm ² | Design. | Function |
|------|-------------------|---|--|
| BK | 3 x 0.5 | 0 V | Supply Voltage 0 VDC |
| VT | | + 24 V | Supply Voltage 24 VDC |
| YE | |  | Low-Noise Ground |
| GN | 2 x 0.25 | CAN_L | Bus Line (Dominant LOW) - Incoming Line |
| RD | | CAN_H | Bus Line (Dominant HIGH) - Incoming Line |
| GR | 3 x 0.25 | CAN_GND | CAN Ground |
| WH | | CAN_L | Bus Line (Dominant LOW) - Return Line |
| BN | | CAN_H | Bus Line (Dominant HIGH) - Return Line |
| BU | 2 x 0.5 | Ö | Emergency Stop Channel 2 |
| BN | | Ö | Emergency Stop Channel 2 |
| RDBU | 5 x 0.25 | - | Not Connected |
| WHGN | | - | Not Connected |
| WHYE | | Ö | Emergency Stop Channel 1 |
| BNGN | | Ö | Emergency Stop Channel 1 |
| PK | | - | Not Connected |
| OR | 5 x 0.25 | - | Not Connected |
| WHPK | | - | Not Connected |
| GRBN | | - | Not Connected |
| WHGR | | - | Not Connected |
| YEEN | | - | Not Connected |




For operating devices with open cable ends, make sure to connect the shield with the protective ground.

4.15 Mounting Variant 14

4.15.1 Pin/Cable Assignment

Pin/cable assignment for open cable end or 16 pin connector.

Table 4-17 Pin/cable assignment

| Pin | Wire | ø mm ² | Design. | Function |
|-----|-----------------|-------------------|---|---|
| 8 | BK | 3 x 0.5 | 0 V | Supply Voltage 0 VDC |
| 9 | VT | | + 24 V | Supply Voltage 24 VDC |
| 10 | YE | |  | Low-Noise Ground |
| 15 | RD | 2 x 0.25 | RTS | Request to Send |
| 16 | GN | | RD | Received Data |
| 7 | BN | 3 x 0.25 | SGND | Signal Ground |
| 13 | WH | | TD | Transmitted Data |
| 14 | GR | | CTS | Clear to Send |
| 3 | BU | 2 x 0.5 | ZST 2.1 | Consent Switch Channel 3 |
| - | BN | | - | Not Connected |
| 1 | RDBU | 5 x 0.25 | ZST 2.2 | Consent Switch Channel 4 |
| 2 | WHGN | | ZST 1.2 | Consent Switch Channel 2 |
| 5 | WHYE | | ZST 1.1 | Consent Switch Channel 1 |
| - | BNGN | | - | Not Connected |
| - | PK | | - | Not Connected |
| 12 | Jumper to Pin 9 | 0,25 | + 24 V | Detection of Operating Device in the System |



For operating devices with open cable ends, make sure to connect the shield with the protective ground.

4.16 Memory Card

You can insert a CompactFlash card on the side of your operating device. The CompactFlash card allows you to exchange projects between the PC and the operating device.

You can recognize the rear side of a CompactFlash card by the notches on each side of the card.

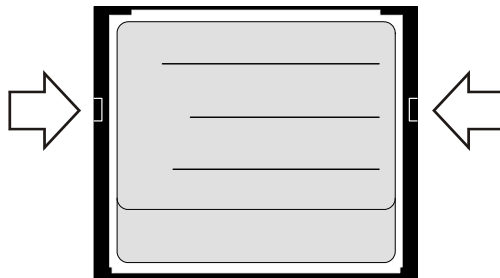


Figure 4-4 Rear view of the memory card

4.16.1 Inserting the Memory Card

When you insert the card from the rear side of the operating device, make sure the rear side of the card is visible. Insert the card until it snaps into place.

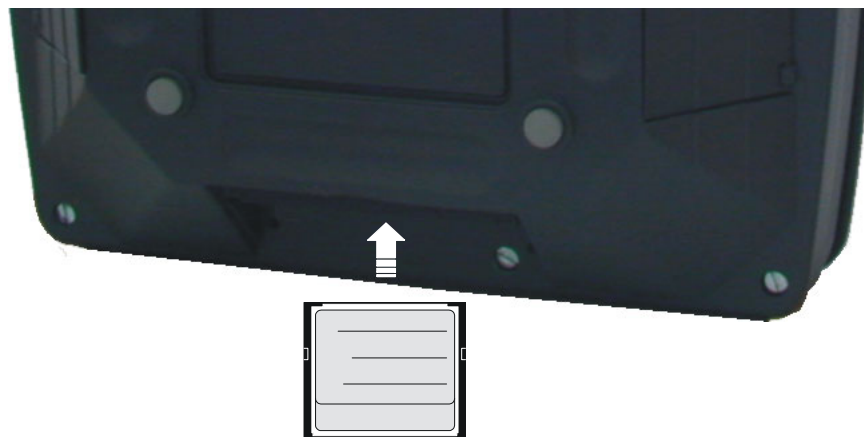


Figure 4-5 Inserting the memory card

4.16.2 Ejecting the Memory Card

To remove the card, press the ejection button on the operating device.

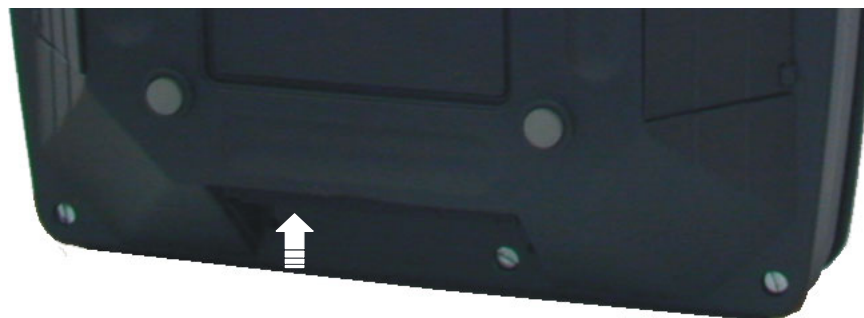


Figure 4-6 Ejecting the memory card

5 Maintenance and Servicing

5.1 Maintenance Interval

The following maintenance intervals are recommended for this operating device:

Table 5-1

| Maintenance work | Interval |
|----------------------|----------|
| Changing the Battery | 4 Years |

5.2 Front Panel

Only use a damp cloth to remove any dirt from the front panel.

5.3 Fuse



The semiconductor fuse cannot be replaced!

A semiconductor fuse is used to protect the device. Once the fuse has been tripped, the device must be disconnected from the supply voltage to allow the semiconductor fuse to regenerate. At an ambient temperature of 20 °C (68 °F), the regeneration takes approximately 20 seconds. The higher the ambient temperature, the longer the regeneration takes.

5.4 Battery

The built-in battery preserves the data in the CMOS-RAM and supplies the real-time clock. The minimum battery life is 5 years, even under unfavorable operating conditions. When the battery runs down, the message „Change battery“ is generated automatically.

We recommend you change the battery approximately every 4 years as part of the regular maintenance work. A prepared battery including connector can be obtained directly from Sutron electronic.

If the „Change battery“ message is detected too late, e.g. the real-time clock stopped or shows the wrong date, data in the CMOS-RAM may have already been lost. For this reason, after changing a battery, always check data such as passwords that can be modified, parameters in the system variables, recipe data sets and entries in the message system.

5.4.1 Changing the Battery



Batteries must only be changed by authorized and trained experts!



For changing the battery you may only use replacement batteries of Sutron electronic.



Electrostatic discharge can damage electronic components! **Observe the ESD protective measures!**



Do not throw lithium batteries into fire, do not heat to 100 °C or higher and do not recharge. **Danger - Explosive!**



Do not open lithium batteries. **Danger - Toxic!**



When opening and closing the operating device, you must take care not to damage the seal and make sure that it always sits in the slot provided.

To ensure that the data in the CMOS-RAM and the time are preserved, it is possible to change the battery under operating voltage. Please note the safety notes!

1. Remove the screws on the rear of the housing and lift off the housing.
2. Remove the cable fastener which secures the battery.
3. Disconnect the battery connector and remove the dead battery.
4. Plug in the cable for the new battery.
5. Use a cable fastener to attach the new battery to the plastic support.
6. Place the rear panel back onto the device.
7. Carefully screw the screws tightly into the rear panel.

5.4.2 Battery Disposal



To prevent short circuitry in the collection boxes, insulate the poles of each battery with insulation tape or put each single battery into a plastic bag.

You must always return old batteries to a dealer or to a returns depot set up for this purpose by the public waste disposal body or a licensed battery dealer for recycling. Only dispose of dead batteries in public or commercial collection boxes. The battery is drained when the message „Change battery“ appears on the display of the device.

6 Technical Data

| Keyboard | |
|-----------------------|--|
| Type | Membrane Keyboard |
| Number of Keys | 5 Function Keys |
| Key Area (Embossment) | 12 mm x 12 mm (0.473" x 0.473") |
| Actuator Travel | 0.6 mm (0.024") |
| Activation Power | 3 N |
| Switching Cycles | Approx. 3 Million under the following conditions: Keystroke Element: Testing Ram (DIN 42115) Keystroke Load: 10 N Keystroke Frequency: 1 Hz |
| Display Elements | 2 Status LEDs |

| Display | |
|----------------------------|-----------------------------------|
| Type | TFT |
| Resolution | 640 x 480 Pixels |
| Colors | 256 |
| Reading Angle | 90° |
| Default Brightness Setting | By User Mode Switch |
| LCD Lifetime | 100,000 h |
| Half-Life Backlighting | 50,000 h |
| Lines | 40 |
| Characters/Line | 80 |
| Display Area (H x W) | 162 mm x 215 mm (6.378" x 8.465") |

| Electrical Data | |
|--------------------------------------|--|
| Supply Voltage | 24 V DC (SELV in Accordance with DIN EN 61131) |
| Residual Ripple | 10% Maximum |
| Minimum Voltage | 19.2 V |
| Maximum Voltage | 30.2 V |
| Power Consumption (Field Bus Device) | 0.7 A |
| Connected Load | 17 W |
| Fuse | Semiconductor Fuse, Self-resetting |
| Protection Against Polarity Reversal | Integrated |

| Consent Switch - Euchner | |
|---------------------------------|----------------------------|
| Type | ZSE2-4C1943 |
| Switching Element | 3-Step Switch (2 Channels) |
| Mechanical Lifetime | 1 Million Switching Cycles |
| Maximum voltage | 24 V AC/DC |
| Maximum current | 1 A |

| Consent Switch - Jokab | |
|-------------------------------|--|
| According to EN 60204-1 | |
| Type | Jokab Safety JSHD4H2 |
| Switching Element | 3-Step Switch (2 Channels) |
| Mechanical Lifetime | >1 Million Switching Cycles (Upper Position to Middle Position) >100 000 Switching Cycles (Middle Position to Lower Position) |
| Maximum voltage | 24 V AC/DC |
| Maximum current | 1 A |

| Key Switch | |
|---------------------|---|
| Type | RAFIX 16 MICROMECC, Square Collar, Latching |
| Switching Element | 2 S, Momentary |
| Mechanical Lifetime | 100 000 Switching Cycles (Latching) |
| Maximum voltage | 24 V AC/DC |
| Maximum current | 1 A |

| Interfaces | |
|--------------------------------------|---|
| Variable Baud Rates and Data Formats | |
| RS232 (Communication) | In Accordance With DIN 66259 T1, CCITT V.28 Transmission Length: 0 - 15 m (0 - 49.212 Feet), Layer-Stranded Conductors, Shielded Galvanically Isolated |
| RS232 (Download / Upload) | In Accordance With DIN 66259 T1, CCITT V.28 Transmission Length: 0 - 15 m (0 - 49.212 Feet), Layer-Stranded Conductors, Shielded Galvanically Not Isolated |

| Central Unit | |
|-----------------------|--|
| Central Unit | 32-bit RISC CPU |
| Clock Frequency | 74 MHz |
| Other Characteristics | Watchdog Timer, Real-Time Clock, Temperature Compensation of the Display, Battery Monitoring |

| Memory | |
|----------------------|-------------------|
| Application Memory | 8 Mbyte Flash |
| Memory Card (Option) | CompactFlash Card |

| Connection System | |
|---|--|
| Angle Connector (Hummel; Parts Family 7301), 16 Pin | |
| Cable Connector (CONINVERS; TU Series), 19 Pin | |
| Female Connector (Binder; 702 Series), 5 Pin | |

| Connecting Cable | |
|---|--|
| Diameter | 10.80 +/- 0.35 mm (0.425 +/- 0.014") |
| Weight | Approx. 172 g/m |
| Bending Radius | Once: $\geq 5 \times$ Cable Diameter Several Times: $\geq 12 \times$ Cable Diameter |
| UL Approved According to Style 20233, 80 °C (176 °F), 300 V | |

| Environmental Conditions | |
|---|--|
| Temperature during operation | 0 °C to 50 °C (32 °F to 122 °F) |
| Temperature during storage, transport | - 25 °C to + 70 °C (-13°F to + 158°F) |
| Relative air humidity for operation and storage | 20 % to 85 %, no condensation |
| Application area | Degree of pollution 1, overvoltage category II |

| Standards and Guidelines | |
|-------------------------------|--|
| Interference Immunity | DIN EN 61000-4-2 DIN EN 61000-4-3 DIN EN 61000-4-4 DIN EN 61000-4-5 DIN EN 61000-4-6 DIN EN 61000-6-2 DIN EN 61000-6-3 Tab. A1 |
| Emitted Interference | DIN EN 55011 Limit Value Class A DIN EN 55022 Limit Value Class A |
| Equipment Requirements | DIN EN 61131 |
| Storage and Transportation | DIN EN 61131-2 |
| Power Supply | DIN EN 61131-2 |
| Electromagnetic Compatibility | 89/336/EEC (Including all Applicable Amendments) |
| Degrees of Protection | DIN EN 60529 |
| Impact Load, Shocks | DIN EN 60068-2-27 |
| Sinusoidal Vibrations | DIN EN 60068-2-6 |
| Corrosion Protection | IEC 60068 |



NOTICE: Radio Interference

This is a class A device. This device may cause radio interference in residential areas. In this case, the user may be required to introduce appropriate countermeasures, and to bear the cost of same.

| Housing | |
|----------------------|---|
| Type | ROSE Limanda |
| Material | Polyamide |
| Impact Resistance | > 7 Nm to DIN 50014 |
| Flammability | V2 to UL94 |
| Degree of Protection | IP65 |
| Total Weight | Approx. 3.2 kg Without Connecting Cable |

7 Ordering Data

Table 7-1 Accessories

| Description | Part Number |
|---|-------------|
| CompactFlash Card 16 MB | 81152.000 |
| CompactFlash Card 32 MB | 81152.032 |
| CompactFlash Adapter for Laptop | 81166.000 |
| CompactFlash Adapter for PC | 81167.000 |
| 5 Pin Download Cable | 88311.020 |
| USB-RS232 Converter for Downloads (In Connection With 88311.030 Only) | 81215.000 |
| Protective Foil for Touch Screen 5.7" (Set With 10 Protective Foils, Scraper And Instructions) | 81251.057 |
| Protective Foil for Touch Screen 10.4" (Set With 10 Protective Foils, Scraper And Instructions) | 81251.104 |
| Protective Foil for Touch Screen 12.1" (Set With 10 Protective Foils, Scraper And Instructions) | 81251.121 |
| Protective Foil for Touch Screen 15" (Set With 10 Protective Foils, Scraper And Instructions) | 81251.150 |
| Battery, Assembled With Cable, Connector And Cable Fastener (Type: CR2450) | 66757.000 |

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Sütron electronic GmbH

Kurze Straße 29

D-70794 Filderstadt

Phone: 0049 711 / 77098-0

Fax: 0049 711 / 77098-60

E-Mail: doku@suetron.de

Internet: www.suetron.com